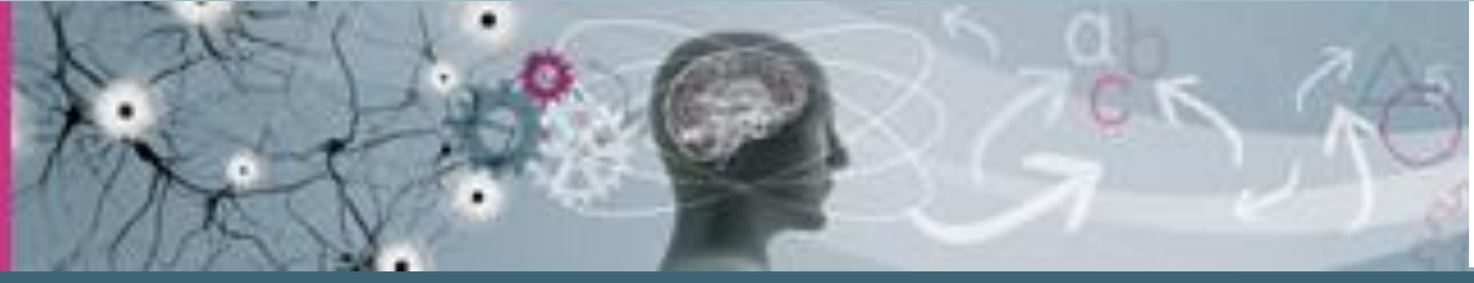
Center for Cognition, Learning and Memory



UNIVERSITÄT BERN

Impacts of a word-picture training on literacy skills in elementary school children and youths with intellectual disabilities

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Introduction

There is convincing evidence that phonological, orthographic and semantic processes influence children's ability to learn reading and spelling words. By frequent reading, children acquire implicit knowledge about the frequency of letter patterns in written words, and they use this knowledge during reading and spelling (Pollo et al., 2009**)**. Additionally, semantic connections facilitate the storing of words in memory (Wang et al., 2011).

We are investigating the effects of a word-picture training (WPT) which is based on statistical and semantic learning on reading in healthy elementary school children and children who are suffering from learning difficulties and / or intellectual disabilities.

First study: 3 interventions with elementary school children

Participants & Methods

132 children from regular elementary schools in Switzerland
- 8-11 years old (2nd, 3rd or 4th graders)
- focused on whole school class interventions
- studying pupils with *diagnosed* learning disabilities or *not diagnosed* learning difficulties

Pre-Tests → Intervention → Post-Tests → Delayed Post-Tests

- Auditory & visual processing
- Phonological awareness
- Reading, spelling
- Working memory
- School behavior
- Intelligence

Word-picture Training (*WPT*)

Working memory training *(Brain Twister, BT*)

Auditory-visual matching training *(Audilex, AL*)

- Auditory & visual processing
- Phonological awareness
- Reading, spelling
- Working memory
- School behavior
- Intelligence

Training: 3x / week, 15min / session, during 8 weeks
= 24 training sessions with educator or psychologist

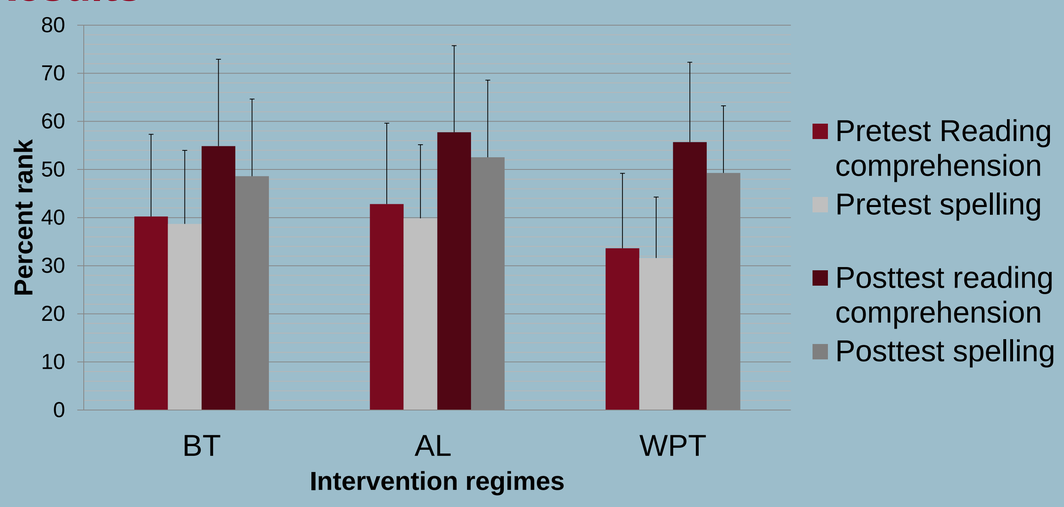
Second study: word-picture training in curative education schools

Participants & Methods

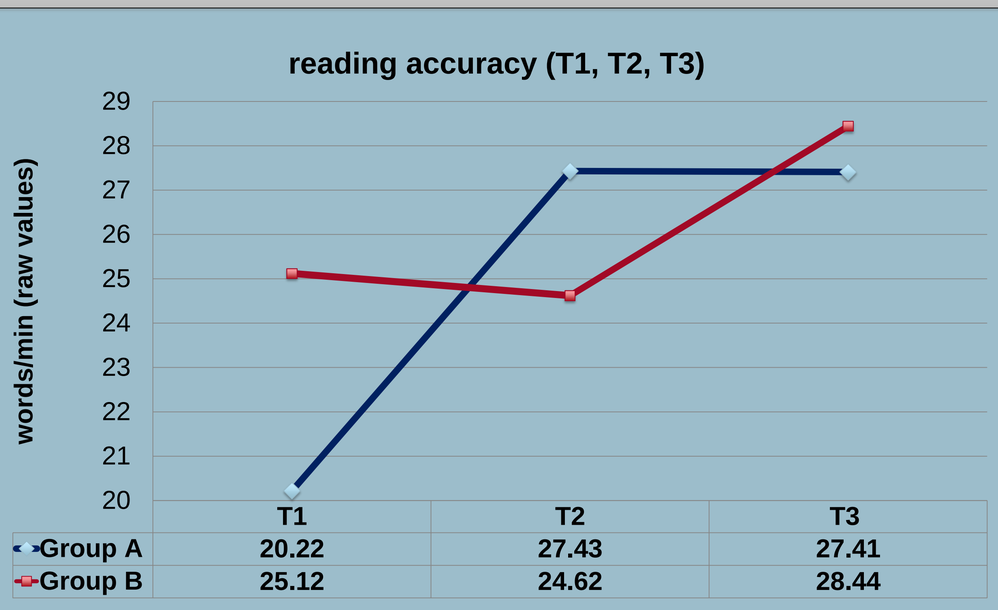
50 children and adolescents from curative education schools in Switzerland with intellectual disabilities (IQ < 75).
- 9-18 years old
- 2 training groups (waiting control group design)
- Test battery (T1, T2, T3): phonological awareness, reading, spelling, attention, intelligence, verbal memory, school behavior

Training: 5x / week, 15min / session, during 4 weeks
= 20 training sessions with educator or psychologist

Results



The word-picture training (WPT) led to substantial gains in reading accuracy in comparison to the working memory training (BT).
Within the word-picture intervention group, children with diagnosed learning disabilities profited more in spelling as children without learning difficulties. Children without learning difficulties benefited more in word comprehension as children with learning difficulties.



The word-picture training led to substantial gains in reading. The effects were preserved six weeks later.
No effects were found in spelling.

General conclusions

Implicit learning processes like statistical learning seem to be largely independent of IQ and age. Our findings highlight the need for frequent reading trainings with semantic connections in order to support the acquisition of literacy skills.

References: Pollo, T. C., Kessler, B., & Treiman, R. (2009). Statistical patterns in children's early writing. *Journal of Experimental Child Psychology*, *104*(4), 410-426. Wang, H. C., Castles, A., Nickels, L., & Nation, K. (2011). Context effects on orthographic learning of regular and irregular words. *Journal of experimental child psychology*, *109*(1), 39-57.

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